Non-cooperative games for self-adaptive telecommunication protocols

Tibor Dulai

By this time telecommunication industry has reached an almost saturated stage in their markets, that is the reason for appearing different additional services, which the operator offer to the users. Because of the high-level technological improvement nowadays telecommunication networks transport not only voice but data and multimedia stream as well. Moreover the devices at the endpoints of the network may totally differ from each other. The heterogenity of physical elements and offered services cause difficult challenges to telecommunication engineers and telecommunication software developers.

The main elements of a telecommunication software are protocols, what are the semantic, syntactic and timing rules of the communication, and they can be realized as finite state machines. The software would be ideal if the protocols would be able to adapt to the environmental changes and to the service which they serve, without any human interaction [1]. The main question is: how to find the optimal parameters of these self adaptive protocols at a certain situation.

One possible answer can be: by the use of game theory [2]. There are several users and possibly more services of one user (the players). Every service (or the protocol which serves the service) has some possible choice at its every decision points (e.g. how to set their parameters). When they choose their actions for certain situations, their strategy profile will be determined. Their outcomes will depend not only on their own decision but on those of the other protocols. The different users / different services want to reach their optimal work according to the environment, to the status of the network and they do not care with the others. The players do not cooperate with each other, each one wants to reach its maximal outcome (e.g. QoS).

In the literature of non-cooperative games [2],[3] there are some solutions for determine the equilibrium of a game. In my work I attempt to apply the theory of non- cooperative games for getting a stable system of self-adaptive telecommunication protocols.

References

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